FRONT TINE TILLER

Owners Manual

Models

902032 24" FRONT TINE TILLER



GB ENGLISH

21547014 Rev 1 02.10.09
Printed in USA

SAFETY RULES

Safe Operation Practices for Walk-Behind Powered Rotary Tillers

TRAINING

- Read the Owner's Manual carefully. Be thoroughly familiar with the controls and the proper use of the equipment. Know how to stop the unit and disengage the controls quickly.
- Never allow children to operate the equipment. Never allow adults to operate the equipment without proper instruction.
- Keep the area of operation clear of all persons, particularly small children, and pets.

PREPARATION

- Thoroughly inspect the area where the equipment is to be used and remove all foreign objects.
- Disengage all clutches and shift into neutral before starting the engine (motor).
- Do not operate the equipment without wearing adequate outer garments. Wear footwear that will improve footing on slippery surfaces.
- Handle fuel with care; it is highly flammable.
- Use an approved fuel container.
- Never add fuel to a running engine or hot engine.
- Fill fuel tank outdoors with extreme care. Never fill fuel tank indoors.
- Replace gasoline cap securely and clean up spilled fuel before restarting.
- Use extension cords and receptacles as specified by the manufacturer for all units with electric drive motors or electric starting motors.
- Never attempt to make any adjustments while the engine (motor) is running (except where specifically recommended by manufacturer).

OPERATION

- Do not put hands or feet near or under rotating parts.
- Exercise extreme caution when operating on or crossing gravel drives, walks, or roads. Stay alert for hidden hazards or traffic. Do not carry passengers.
- After striking a foreign object, stop the engine (motor), remove the wire from the spark plug, thoroughly inspect the tiller for any damage, and repair the damage before restarting and operating the tiller.
- Exercise caution to avoid slipping or falling.
- If the unit should start to vibrate abnormally, stop the engine (motor) and check immediately for the cause. Vibration is generally a warning of trouble.
- Stop the engine (motor) when leaving the operating position.
- Take all possible precautions when leaving the machine unattended. Disengage the tines, shift into neutral, and stop the engine.
- Before cleaning, repairing, or inspecting, shut off the engine and make certain all moving parts have stopped. Disconnect the spark plug wire, and keep the wire away from the plug to prevent accidental starting. Disconnect the cord on electric motors.
- Do not run the engine indoors; exhaust fumes are dangerous.
- Never operate the tiller without proper guards, plates, or other safety protective devices in place.
- Keep children and pets away.
- Do not overload the machine capacity by attempting to till too deep at too fast a rate.
- Never operate the machine at high speeds on slippery surfaces. Look behind and use care when backing.
- Never allow bystanders near the unit.
- Use only attachments and accessories approved by the manufacturer of the tiller.
- Never operate the tiller without good visibility or light.
- Be careful when tilling in hard ground. The tines may catch in the ground and propel the tiller forward. If this occurs, let go of the handlebars and do not restrain the machine.

MAINTENANCE AND STORAGE

- Keep machine, attachments, and accessories in safe working condition.
- Check shear pins, engine mounting bolts, and other bolts at frequent intervals for proper tightness to ensure the equipment is in safe working condition.
- Never store the machine with fuel in the fuel tank inside a building where ignition sources are present, such as hot water and space heaters, clothes dryers, and the like. Allow the engine to cool before storing in any enclosure.
- Always refer to the operator's guide instructions for important details if the tiller is to be stored for an extended period.

- IMPORTANT -

CAUTIONS, IMPORTANTS, AND NOTES ARE A MEANS OF ATTRACTING ATTENTION TO IMPORTANT OR CRITICAL INFORMATION IN THIS MANUAL.

IMPORTANT: USED TO ALERT YOU THAT THERE IS A POSSIBILITY OF DAMAGING THIS EQUIPMENT.

NOTE: Gives essential information that will aid you to better understand, incorporate, or execute a particular set of instructions.

Look for this symbol to point out important safety precautions. It means CAUTION!!! BECOME ALERT!!! YOUR SAFETY IS INVOLVED.

CAUTION: Always disconnect spark plug wire and place wire where it cannot contact spark plug in order to prevent accidental starting when setting up, transporting, adjusting or making repairs.

WARNING

The engine exhaust from this product contains chemicals known to the State of California to cause cancer, birth defects, or other reproductive harm.

PRODUCT SPECIFICATIONS

Gasoline Capacity:	3.6 Quarts (3.4L) Unleaded Regular
Oil (API-SG-SL): (Capacity: 20 oz./0.6L)	SAE 10w-30(Above 32°F/0°C) SAE 5w-30(Below 32°F/0°C)
Spark Plug: (Gap: .030"/0.76mm)	NGK BR-5HS (Champion RL86C)

CONGRATULATIONS on your purchase of a new tiller. It has been designed, engineered and manufactured to give you the best possible dependability and performance.

Should you experience any problems you cannot easily remedy, please contact your nearest authorized service center. We have competent, well-trained technicians and the proper tools to service or repair this unit.

Please read and retain this manual. The instructions will enable you to assemble and maintain your tiller properly. Always observe the "SAFETY RULES".

CUSTOMER RESPONSIBILITIES

- Read and observe the safety rules.
- Follow a regular schedule in maintaining, caring for and using your tiller.
- Follow instructions under "Maintenance" and "Storage" sections of this Manual.

IMPORTANT: THIS UNIT IS EQUIPPED WITH AN INTERNAL COMBUSTION ENGINE AND SHOULD NOT BE USED ON OR NEAR ANY UNIMPROVED FOREST-COVERED, BRUSH-COVERED OR GRASS COVERED LAND UNLESS THE ENGINE'S EXHAUST SYSTEM IS EQUIPPED WITH A SPARK ARRESTER MEETING APPLICABLE LOCAL LAWS (IF ANY). IF A SPARK ARRESTER IS USED, IT SHOULD BE MAINTAINED IN EFFECTIVE WORKING ORDER BY THE OPERATOR.

IN THE STATE OF CALIFORNIA, A SPARK ARRESTER IS REQUIRED BY LAW (SECTION 4442 OF THE CALIFORNIA PUBLIC RESOURCES CODE). OTHER STATES MAY HAVE SIMILAR LAWS. FEDERAL LAWS APPLY ON FEDERAL LANDS. SEE YOUR AUTHORIZED SERVICE CENTER/DEPARTMENT FOR SPARK ARRESTER.

TABLE OF CONTENTS

ASSEMBLY

Your new tiller has been assembled at the factory with exception of those parts left unassembled for shipping purposes. To ensure safe and proper operation of your tiller all parts and hardware you assemble must be tightened securely. Use the correct tools as necessary ensure proper tightness.

TOOLS REQUIRED FOR ASSEMBLY

A socket wrench set will make assembly easier. Standard wrench sizes are listed.

(1) Utility Knife

(1) Screwdriver

(2) 1/2" Wrenches

OPERATOR'S POSITION (See Fig. 1)

When right or left hand is mentioned in this manual, it means when you are in the operating position (standing behind tiller handles).

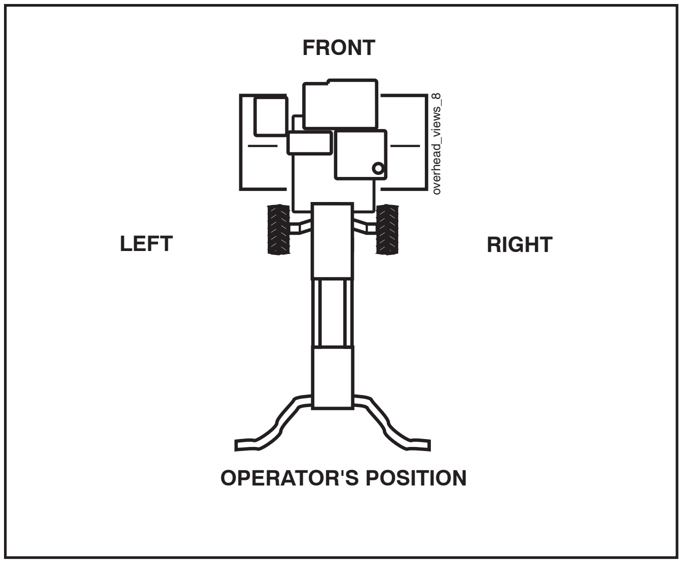
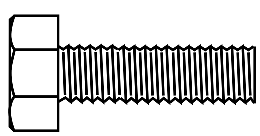
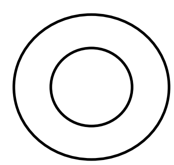


Fig. 1

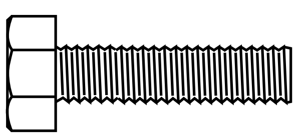
CONTENTS OF HARDWARE PACK



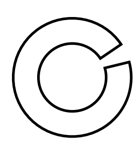
(2) Hex Bolts 5/16-18 x 1



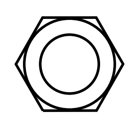
(4) Washers 3/8 x 7/8 x 14



(4) Hex Bolts 5/16-18 x 1-1/4



(6) Lock Washers 5/16



(6) Hex Nuts 5/16-18

UNPACK CARTON & INSTALL HANDLE (See Fig. 2)

CAUTION: Be careful of exposed staples when handling or disposing of cartoning material.

IMPORTANT: WHEN UNPACKING AND ASSEMBLING TILLER, BE CAREFUL NOT TO STRETCH OR KINK CABLE(S).

- Cut cable ties securing handles.
- Slowly lift handle assembly up, route cable(s) as shown and align handle holes with handle panel hole and slot.
- Loosely assemble hardware as shown. the shorter (1" long) hex bolt is assembled in lower hole of handle. Repeat for opposite side. Tighten all hardware securely.
- Cut cable ties securing tiller to skid and remove tiller from skid.
- Remove screws securing depth stake to skid and discard the screws.

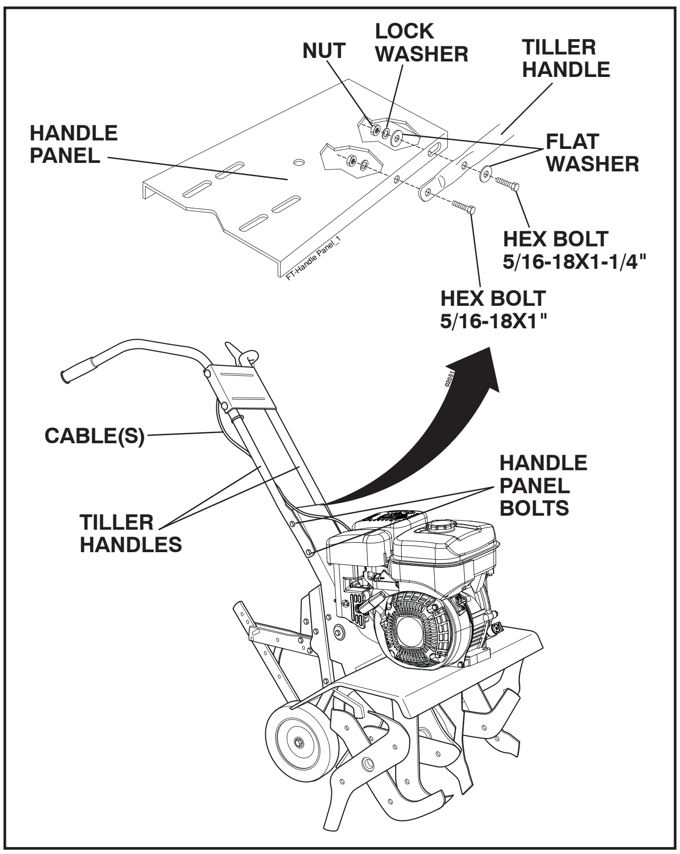


Fig. 2

INSTALL DEPTH STAKE ASSEMBLY (See Fig. 3)

- Loosen nut “A”.
- Insert stake support between engine bracket halves with stake spring down.
- Bolt stake support to engine brackets with bolts, lock washers and nuts. Tighten securely. Tighten nut “A”.
- Depth stake must move freely. If it does not, loosen support bolt.

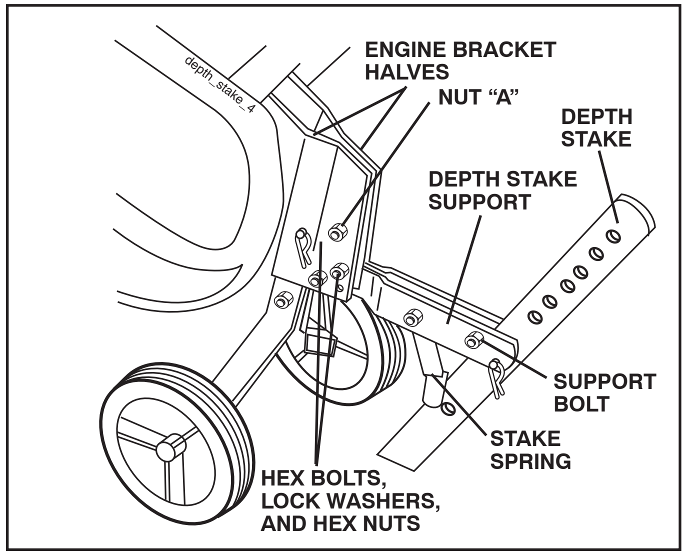


Fig. 3

HANDLE HEIGHT

- Handle height may be adjusted to better suit operator. (See “HANDLE HEIGHT” in the Service and Adjustments section of this manual.)

TILLING WIDTH

- Tilling width may be adjusted to better handle your tilling conditions (See “TINE ARRANGEMENT” in the Service and Adjustments section of this manual.)

TINE OPERATION

- Check tine operation before first use. (See “TINE OPERATION CHECK” in the Service and Adjustments section of this manual.)

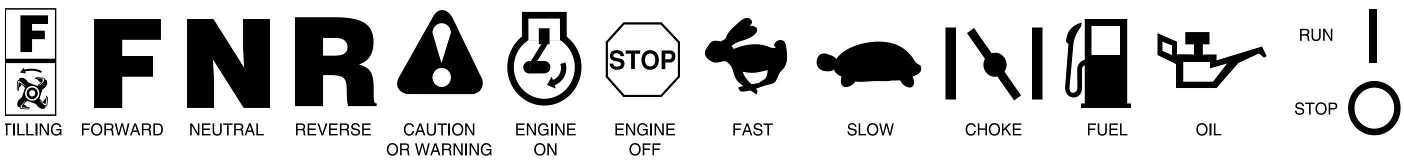
OPERATION

KNOW YOUR TILLER

READ THIS MANUAL AND SAFETY RULES BEFORE OPERATING YOUR TILLER.

Compare the illustrations with your tiller to familiarize yourself with the location of various controls and adjustments. Save this manual for future reference.

These symbols may appear on your Tiller or in literature supplied with the product. Learn and understand their meaning.



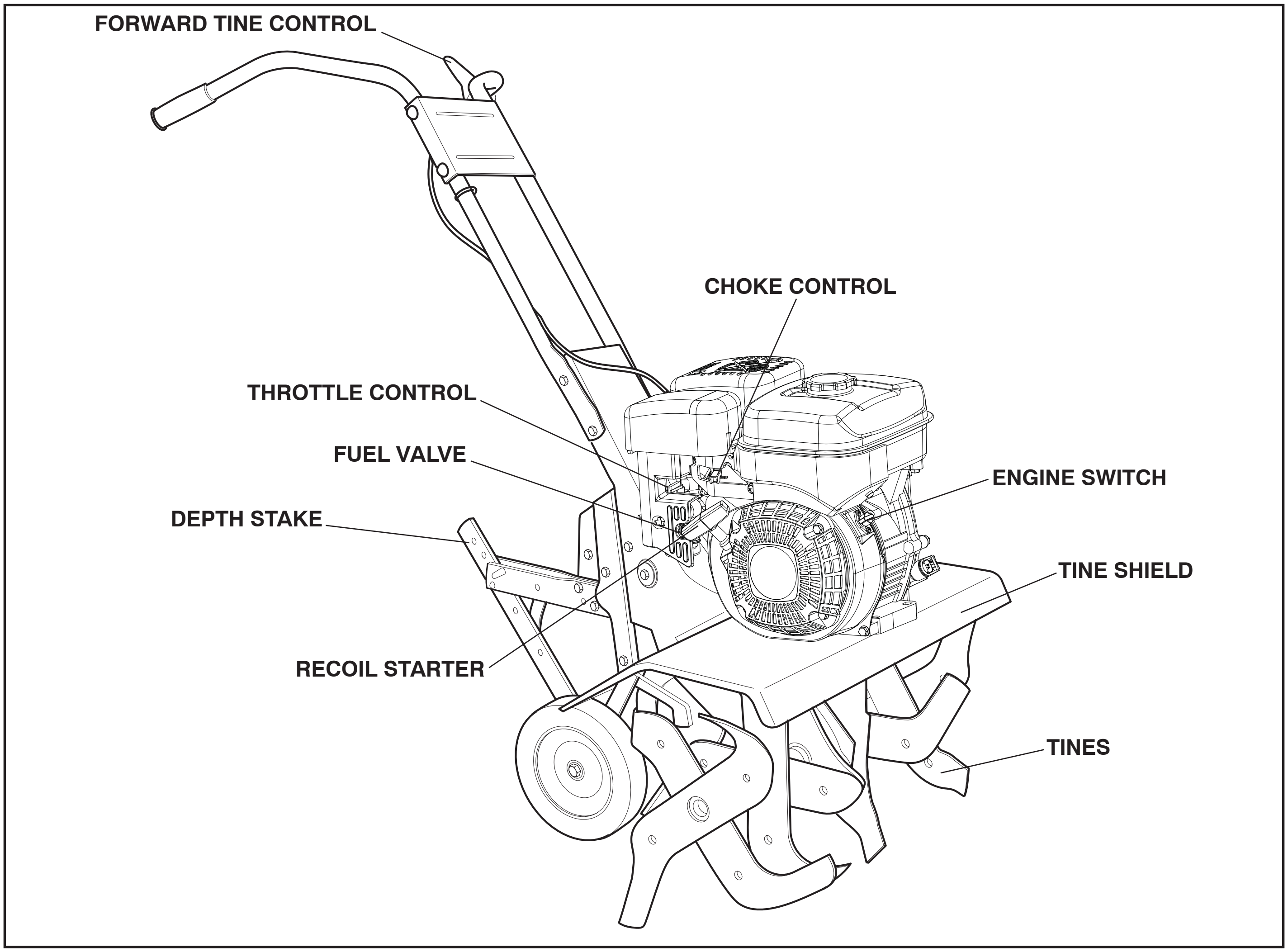


Fig. 4

MEETS ANSI SAFETY REQUIREMENTS

Our tillers conform to the safety standards of the American National Standards Institute.

CHOKE CONTROL - Used when starting a cold engine.

DEPTH STAKE - Controls forward speed and the depth at which the tiller will dig.

ENGINE ON/OFF SWITCH - The engine switch enables and disables the ignition system.

FORWARD TINE CONTROL - Engages tines in forward direction.

FUEL VALVE - The fuel valve opens and closes the passage between the fuel tank and the carburetor.

RECOIL STARTER HANDLE - Used to start the engine. direction.

THROTTLE CONTROL - Controls engine speed.



The operation of any tiller can result in foreign objects thrown into the eyes, which can result in severe eye damage. Always wear safety glasses or eye shields before starting your tiller and while tilling. We recommend a wide vision safety mask for over spectacles or standard safety glasses.

HOW TO USE YOUR TILLER

Know how to operate all controls before adding fuel and oil or attempting to start engine.

STOPPING (See Fig. 5)

TINES

1. Release tine control to stop movement.

ENGINE

2. Set the speed control lever at the low speed position and allow the engine to run at low speed for 1 or 2 minutes before stopping.
3. Turn the ENGINE SWITCH counterclockwise to the position " O " (OFF).
4. Close the fuel valve.
5. Pull the starter handle slowly and return the handle to its original position when resistance is felt. This operation is necessary to prevent outside moist air from intruding into the combustion chamber.

NOTE: Never use choke to stop engine.

IMPORTANT: TO STOP ENGINE IN AN EMERGENCY, TURN THE ENGINE SWITCH TO THE OFF POSITION.

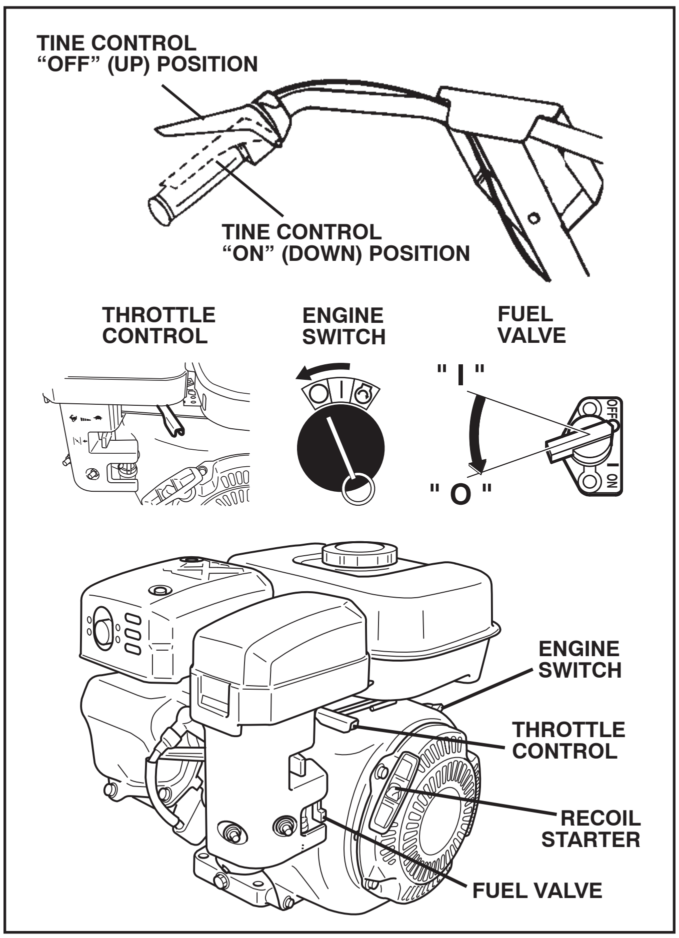


Fig. 5

TINE OPERATION (See Fig. 5)

- Squeeze tine control to handle.

TILLING

The speed and depth of tilling is regulated by the position of the depth stake and wheel height.

The depth stake should always be below the wheels for digging. It serves as a brake to slow the tiller's forward motion to enable the tines to penetrate the ground. Also, the more the depth stake is lowered into the ground the deeper the tines will dig.

DEPTH STAKE (See Fig. 6)

Adjust depth stake by removing the hairpin clip and clevis pin. Change depth stake to desired position. Replace the clevis pin and hairpin clip.

- For normal tilling, set depth stake at the second or third hole from the top.

WHEELS (See Fig. 6)

Adjust wheels by removing the hairpin clip and clevis pin. Change wheel position. Replace the hairpin clip and clevis pin.

- For normal tilling, set wheels at the second or third hole from the top.

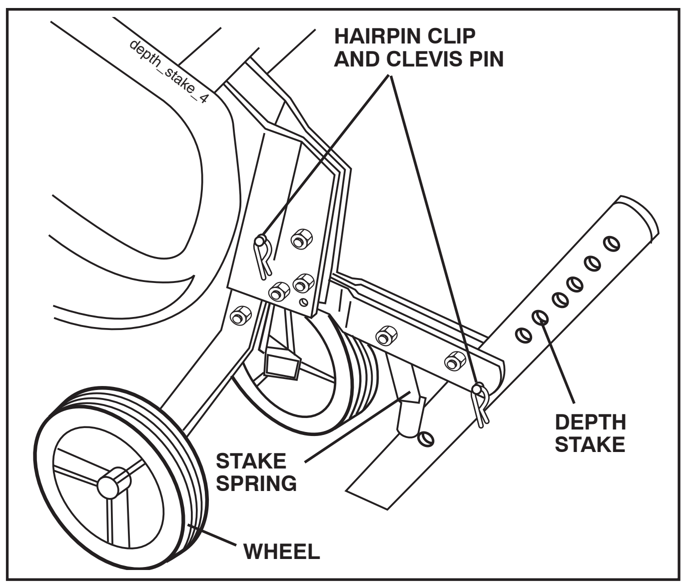


Fig. 6

TO TRANSPORT

CAUTION: Before lifting or transporting, allow tiller engine and muffler to cool. Disconnect spark plug wire. Drain gasoline from fuel tank.

AROUND THE YARD
- Tip depth stake forward until it is held by the stake spring.
- Push tiller handles down, raising tines off the ground.
- Push or pull tiller to desired location.

AROUND TOWN
- Disconnect spark plug wire.
- Drain fuel tank.
- Transport in upright position to prevent oil leakage.

BEFORE STARTING ENGINE

IMPORTANT: BE VERY CAREFUL NOT TO ALLOW DIRT TO ENTER THE ENGINE WHEN CHECKING OR ADDING OIL OR FUEL. USE CLEAN OIL AND FUEL AND STORE IN APPROVED, CLEAN, COVERED CONTAINERS. USE CLEAN FILL FUNNELS.

FILL ENGINE WITH OIL (See Fig. 7)
1. Remove hangtag from engine.
2. With engine level, remove engine oil filler plug.
3. Fill engine with oil to point of overflowing. For approximate capacity see “PRODUCT SPECIFICATIONS” on page 3 of this manual. All oil must meet A.P.I. Service Classification SG-SL.
4. Tilt tiller back on its wheels and then re-level.
5. With engine level, refill to point of overflowing if necessary. Replace oil filler plug.

- For cold weather operation you should change oil for easier starting (See “OIL VISCOSITY CHART” in the Maintenance section of this manual).
- To change engine oil, see the Maintenance section of this manual.

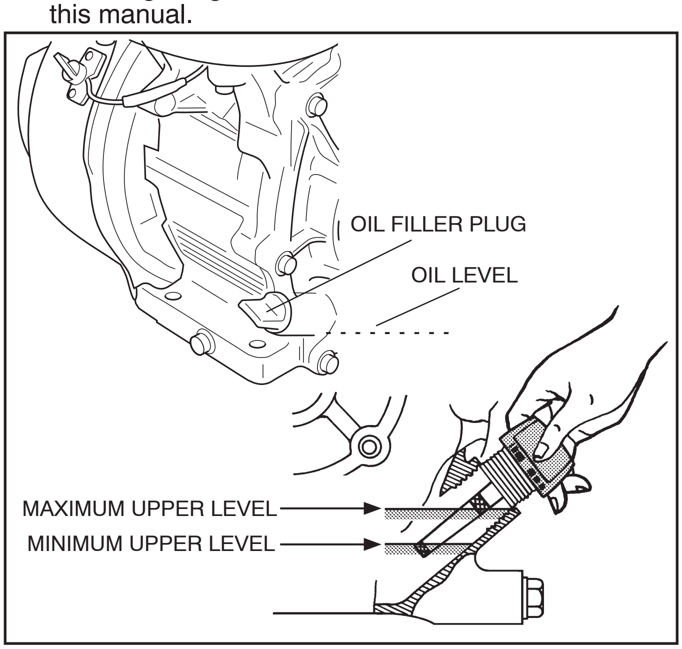


Fig. 7

ADD GASOLINE
- Fill fuel tank to bottom of filler neck. Do not overfill. Use fresh, clean, regular unleaded gasoline with a minimum of 87 octane. (Use of leaded gasoline will increase carbon and lead oxide deposits and reduce valve life). Do not mix oil with gasoline. Purchase fuel in quantities that can be used within 30 days to assure fuel freshness.

CAUTION: Fill to within 1/2 inch of top of fuel tank to prevent spills and to allow for fuel expansion. If gasoline is accidentally spilled, move machine away from area of spill. Avoid creating any source of ignition until gasoline vapors have disappeared.

Wipe off any spilled oil or fuel. Do not store, spill or use gasoline near an open flame.

IMPORTANT: WHEN OPERATING IN TEMPERATURES BELOW 32°F(0°C), USE FRESH, CLEAN WINTER GRADE GASOLINE TO HELP ENSURE GOOD COLD WEATHER STARTING.

CAUTION: Alcohol blended fuels (called gasohol or using ethanol or methanol) can attract moisture which leads to separation and formation of acids during storage. Acidic gas can damage the fuel system of an engine while in storage. To avoid engine problems, the fuel system should be emptied before storage of 30 days or longer. Drain the gas tank, start the engine and let it run until the fuel lines and carburetor are empty. Use fresh fuel next season. See Storage Instructions for additional information. Never use engine or carburetor cleaner products in the fuel tank or permanent damage may occur.

TO START ENGINE (See Fig. 8)

CAUTION: KEEP TINE CONTROL IN “OFF” POSITION WHEN STARTING ENGINE.

1. Open the fuel valve.
2. Turn the ENGINE SWITCH to the position “ I ” (ON).
3. Set the speed control lever 1/3 of the way towards the high speed position.
4. Close the choke lever.

NOTE: If the engine is cold or the ambient temperature is low, close the choke lever fully.

NOTE: If the engine is warm or the ambient temperature is high, open the choke lever half-way, or keep it fully open.

5. Pull the starter handle slowly until resistance is felt. This is the “compression” point. Return the handle to its original position and pull swiftly. Do not pull out the rope all the way. After starting the engine, allow the starter handle to return to its original position while still holding the handle.

6. After starting the engine, gradually open choke by turning the choke lever and finally keep it fully opened. Do not fully open the choke lever immediately when the engine is cold or the ambient temperature is low, because the engine may stop.

NOTE: If engine does not start, see troubleshooting points.

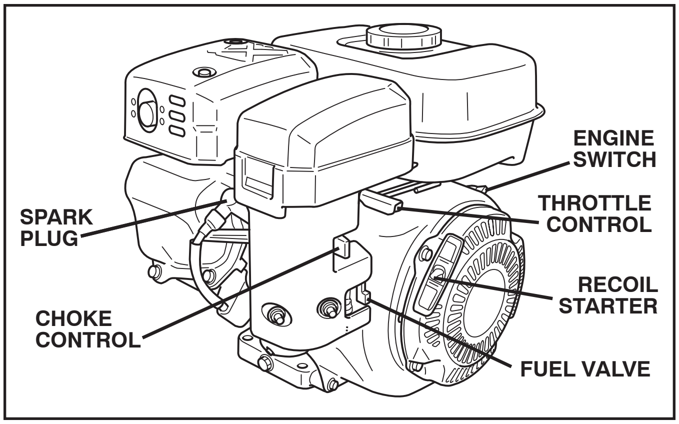


Fig. 8

BREAKING IN YOUR TILLER

Break-in your belt(s), pulleys and tine control before you actually begin tilling.

- Start engine, tip tines off ground by pressing handles down and engage tine control to start tine rotation. Allow tines to rotate for five minutes.
- Check tine operation and adjust if necessary. See "TINE OPERATION CHECK" in the Service and Adjustments section of this manual.

TILLING HINTS

CAUTION: Until you are accustomed to handling your tiller, start actual field use with throttle in slow position.

To help tiller move forward, lift up the handles slightly (thus lifting depth stake out of ground). To slow down the tiller, press down on handles.

If you are straining or tiller is shaking, the wheels and depth stake are not set properly in the soil being tilled. The proper setting of the wheels and depth stake is through trial and error and depends upon the soil condition. (The harder or wetter the ground, the slower the engine and tine speed needed. Under these poor conditions, at fast speed the tiller will run and jump over the ground).

A properly adjusted tiller will dig with little effort from the operator.

- Tilling is digging into, turning over, and breaking up packed soil before planting. Loose, unpacked soil helps root growth. Best tilling depth is 4"-6". A tiller will also clear the soil of unwanted vegetation. The decomposition of this vegetable matter enriches the soil. Depending on the climate (rainfall and wind), it may be advisable to till the soil at the end of the growing season to further condition the soil.
- Soil conditions are important for proper tilling. Tines will not readily penetrate dry, hard soil which may contribute to excessive bounce and difficult handling of your tiller. Hard soil should be moistened before tilling; however, extremely wet soil will "ball-up" or clump during tilling. Wait until the soil is less wet in order to achieve the best results. When tilling in the fall, remove vines and long grass to prevent them from wrapping around the tine shaft and slowing your tilling operation.
- You will find tilling much easier if you leave a row untilled between passes. Then go back between tilled rows. (See Fig. 9) There are two reasons for doing this. First, wide turns are much easier to negotiate than about-faces. Second, the tiller won't be pulling itself, and you, toward the row next to it.
- Set depth stake and wheel height for shallow tilling when working extremely hard soil or sod. Then work across the first cuts at normal depth.

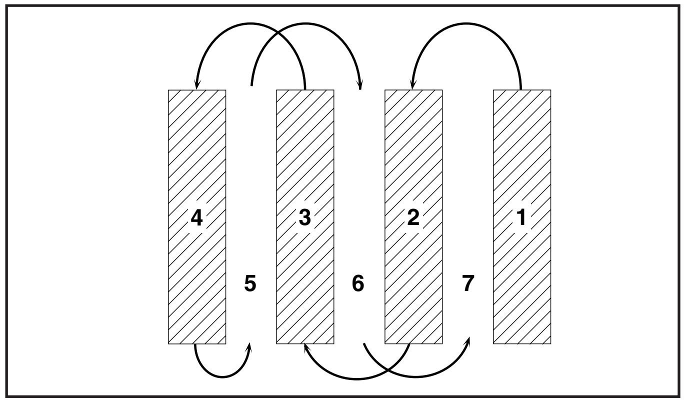


Fig. 9

CULTIVATING

Cultivating is destroying the weeds between rows to prevent them from robbing nourishment and moisture from the plants. At the same time, breaking up the upper layer of soil crust will help retain moisture in the soil. Best digging depth is 1"-3".

- You will probably not need to use the depth stake. Begin by tipping the depth stake forward until it is held by the stake spring.
- Cultivate up and down the rows at a speed which will allow tines to uproot weeds and leave the ground in rough condition, promoting no further growth of weeds and grass (See Fig. 10).

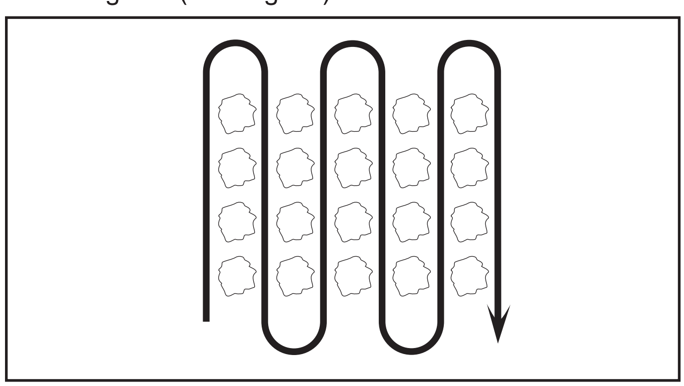


Fig. 10

MAINTENANCE

MAINTENANCE SCHEDULE FILL IN DATES AS YOU COMPLETE REGULAR SERVICE	BEFORE EACH USE	EVERY 5 HOURS	EVERY 20 HOURS	EVERY 50 HOURS	EVERY 200 HOURS	EVERY 500 HOURS	SERVICE DATES							
Check Engine Oil Level	✔	✔												
Change Engine Oil			✔ 3	✔ 1,2										
Oil Pivot Points		✔												
Inspect Spark Arrester / Muffler				✔										
Clean Air Cleaner				✔ 2										
Replace Air Cleaner Cartridge					✔ 2									
Clean Engine Cylinder Fins	✔													
Replace Spark Plug						✔								

1 - Change more often when operating under a heavy load or in high ambient temperatures.
2 - Service more often when operating in dirty or dusty conditions.
3 - Initial oil change should be performed after first twenty (20) hours of operations.

GENERAL RECOMMENDATIONS

The warranty on this tiller does not cover items that have been subjected to operator abuse or negligence. To receive full value from the warranty, the operator must maintain tiller as instructed in this manual.

Some adjustments will need to be made periodically to properly maintain your tiller.

At least once a season, check to see if you should make any of the adjustments described in the Service and Adjustments section of this manual.

- Once a year you should replace the spark plug, clean or replace air filter, and check tines and belts for wear. A new spark plug and clean air filter assure proper air-fuel mixture and help your engine run better and last longer.

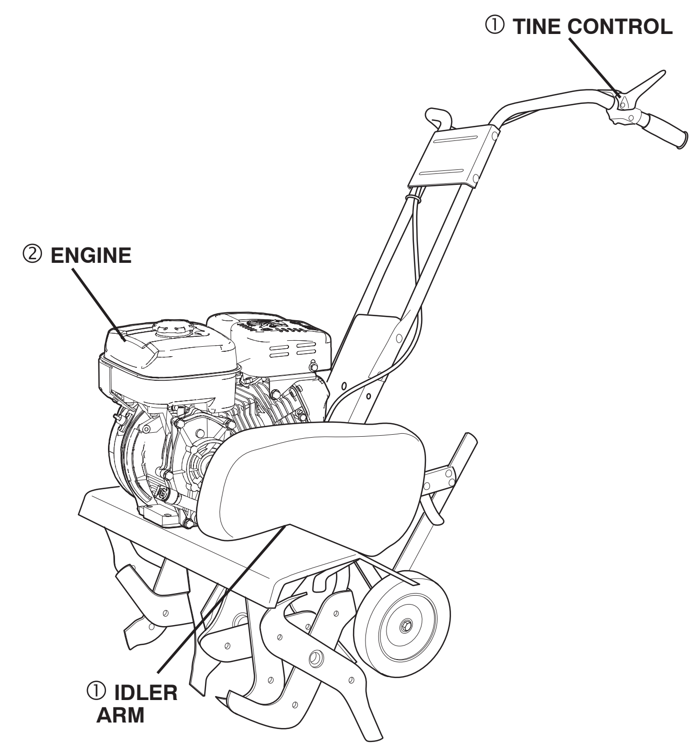
BEFORE EACH USE

- Check engine oil level.
- Check tine operation.
- Check for loose fasteners.

LUBRICATION

Keep unit well lubricated (See “LUBRICATION CHART”).

LUBRICATION CHART



①SAE 30 OR 10W-30 MOTOR OIL
②REFER TO MAINTENANCE “ENGINE” SECTION

MAINTENANCE

Disconnect spark plug wire before performing any maintenance (except carburetor adjustment) to prevent accidental starting of engine.

Prevent fires! Keep the engine free of grass, leaves, spilled oil, or fuel. Remove fuel from tank before tipping unit for maintenance. Clean muffler area of all grass, dirt, and debris.

Do not touch hot muffler or cylinder fins as contact may cause burns.

ENGINE

LUBRICATION

Use only high quality detergent oil rated with API service classification SG-SL. Select the oil's SAE viscosity grade according to your expected temperature.

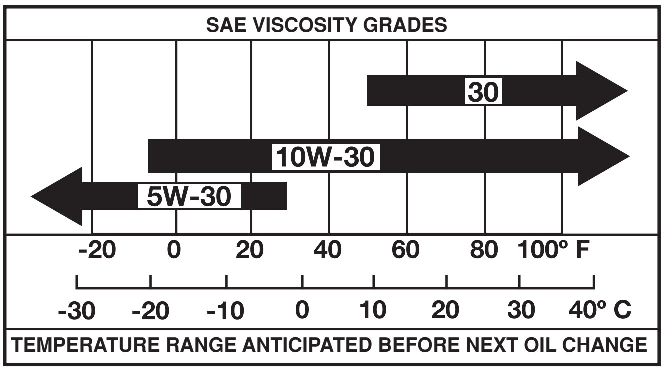


Fig. 11

NOTE: Although multi-viscosity oils (5W-30, 10W-30, etc.) improve starting in cold weather, these multi viscosity oils will result in increased oil consumption when used above 32°F (0°C). Check your engine oil level more frequently to avoid possible engine damage from running low on oil.

Change the oil after every 50 hours of operation or at least once a year if the tiller is not used for 50 hours in one year.

Check the crankcase oil level before starting the engine and after each five (5) hours of continuous use. Add SAE 30 motor oil or equivalent. Tighten oil filler plug securely each time you check the oil level.

TO CHANGE ENGINE OIL (See Figs. 11 and 12)
Determine temperature range expected before oil change. All oil must meet API service classification SG-SL.

- Ensure tiller is on level surface.
- Oil will drain more freely when warm.
- Catch oil in a suitable container.
- Remove drain plug.
- Tip tiller forward to drain oil.

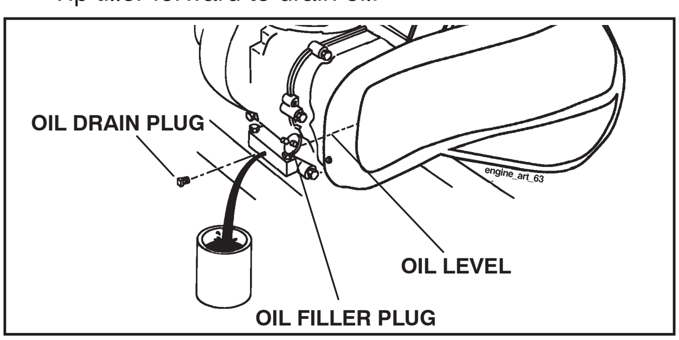


Fig. 12

- After oil has drained completely, replace oil drain plug and tighten securely.
- Remove oil filler plug. Be careful not to allow dirt to enter the engine.
- Refill engine with oil. See "CHECK ENGINE OIL LEVEL" in the Operation section of this manual.

CLEANING AIR CLEANER

A dirty air cleaner element will cause starting difficulty, power loss, engine malfunctions, and shorten engine life extremely. Always keep the air cleaner element clean.

DUAL ELEMENT TYPE

- Urethane Foam cleaning (See Fig.13)

Wash and clean the urethane foam with detergent. After cleaning, dry it. Clean the urethane foam element every 50 hours.

- Second element (See Fig.13)

Clean by tapping gently to remove dirt and blow off dust. Never use oil. Clean the paper element every 50 hours of operation, and replace element set every 200 hours. Clean and replace air cleaner elements more often when operating in dusty environments.

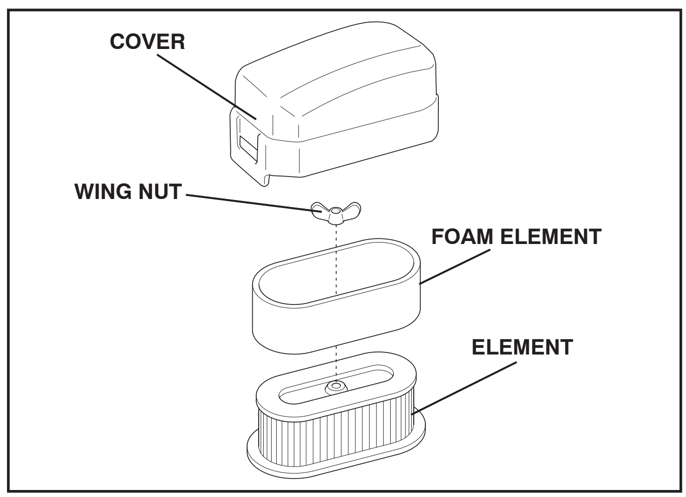


Fig. 13

COOLING SYSTEM (See Fig. 14)

Your engine is air cooled. For proper engine performance and long life keep your engine clean.

- Clean air screen frequently using a stiff-bristled brush.
- Remove blower housing and clean as necessary.
- Keep cylinder fins free of dirt and chaff.

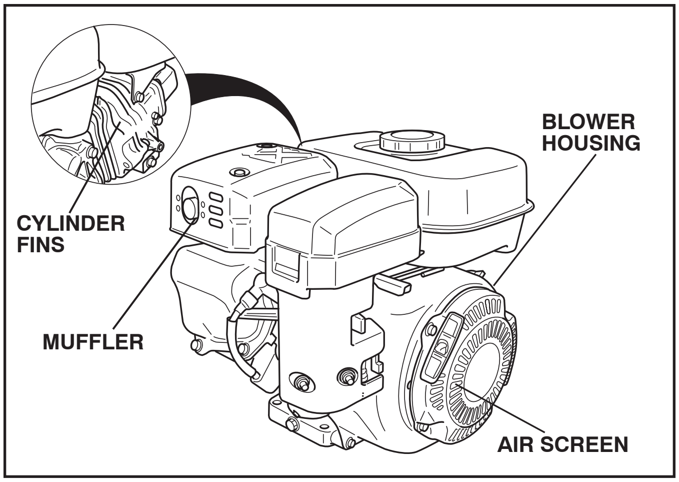


Fig. 14

MUFFLER

Do not operate tiller without muffler. Do not tamper with exhaust system. Damaged mufflers or spark arresters could create a fire hazard. Inspect periodically and replace if necessary. If your engine is equipped with a spark arrester screen assembly, remove every 50 hours for cleaning and inspection. Replace if damaged.

SPARK PLUG

Replace spark plugs at the beginning of each tilling season or after every 50 hours of use, whichever comes first. Spark plug type and gap setting are shown in “PRODUCT SPECIFICATIONS” on page 3 of this manual.

TRANSMISSION

Your transmission is sealed and will not require lubrication unless serviced.

CLEANING

Do not clean your tiller when the engine and transmission are hot. We do not recommend using pressurized water (garden hose, etc.) to clean your unit unless the gasket area around the transmission and the engine muffler, air filter and carburetor are covered to keep water out. Water in engine will shorten the useful life of your tiller.

- Clean engine, wheels, finish, etc. of all foreign matter.
- Keep finished surfaces and wheels free of all gasoline, oil, etc.
- Protect painted surfaces with automotive type wax.

CAUTION: Disconnect spark plug wire from spark plug and place wire where it cannot come into contact with plug.

TILLER

TO ADJUST HANDLE HEIGHT (See Fig. 15)

Factory assembly has provided lowest handle height. Select handle height best suited for your tilling conditions. Handle height will be different when tiller digs into soil.

- If a higher handle height is desired, loosen the four nuts securing handle panel to engine brackets.
- Slide handle panel to desired location.
- Tighten the four nuts securely.

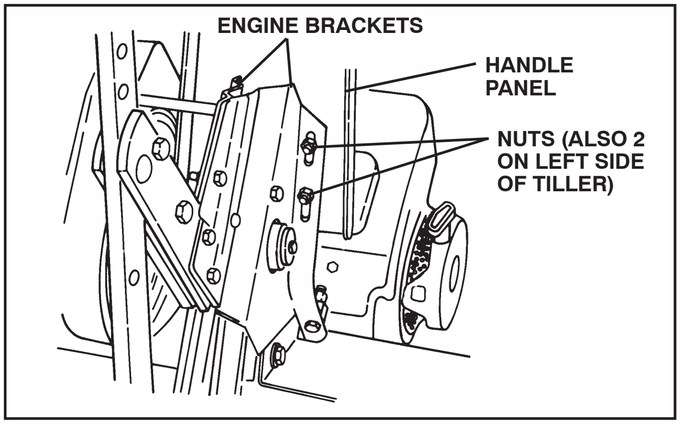


Fig. 15

TINE ARRANGEMENT

Your outer tines can be assembled in several different ways to suit your tilling or cultivating needs.

CAUTION: Tines are sharp. Wear gloves or other protection when handling tines.

NORMAL TILLING - 24" PATH (See Fig. 16)

- Assemble holes “A” in tine hubs to holes “B” in tine shaft.

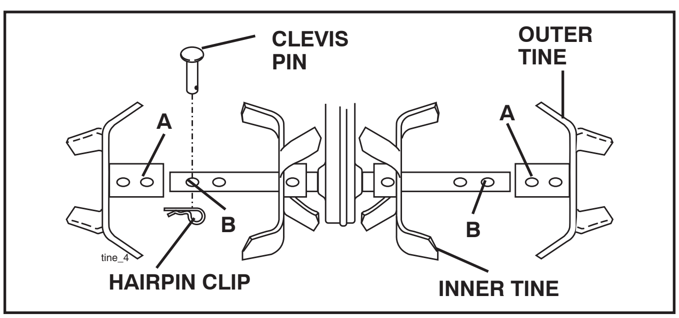


Fig. 16

MID-WIDTH TILLING - 22" PATH (See Fig. 17)

- Assemble holes “A” in tine hubs to holes “C” in tine shaft.

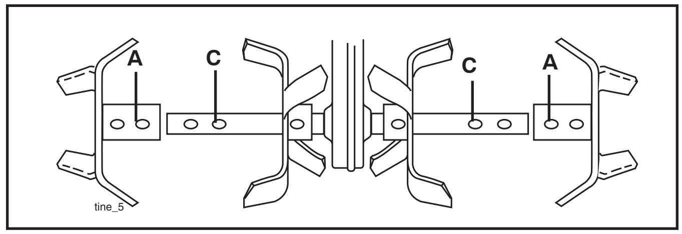


Fig. 17

NARROW TILLING/CULTIVATING - 12" PATH (See Fig. 18)

- Remove outer tines.

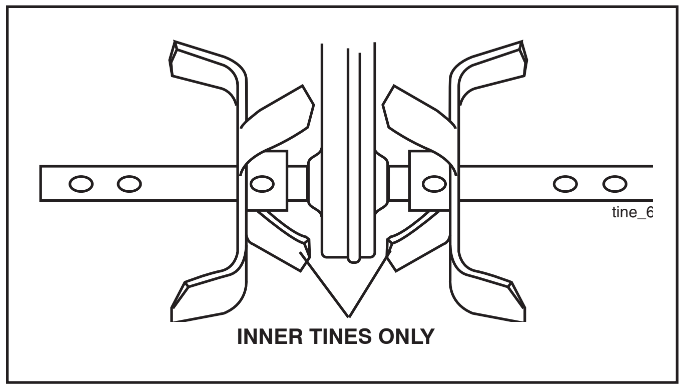


Fig. 18

NOTE: When reassembling outer tines, ensure right tine assembly (marked “R”) and left tine assembly (marked “L”) are mounted to correct side of tine shaft.

TINE OPERATION CHECK (See Fig.19)

> **WARNING: Disconnect spark plug wire from spark plug to prevent starting while checking tine operation.**

For proper tine operation, tine control lever must be against control body and all slack removed from inner wire of control cable when control is in the “OFF” (up) position.

If lever and cable are loose, loosen cable clip at lower end of cable. Pull up on cable to remove slack, without extending spring on end of cable, and retighten cable clip.

FINAL CHECK “OFF” POSITION

- With tine control “OFF” (up), push down on handle to raise tines off the ground.
- Slowly pull recoil starter handle while observing tines. Tines should not rotate.
- If tines rotate, inner wire of control cable is too tight which is extending lower spring and engaging tines. Loosen cable clip and push down on cable only enough to relieve spring tension. Tighten cable clip.
- Recheck in “OFF” position and adjust if necessary.

FINAL CHECK “ON” POSITION

- With tine control “ON” (held down to handle) push down on handle to raise tines off the ground.
- Slowly pull recoil starter handle while observing tines. Tines should rotate forward.
- If tines do not rotate, inner wire of control cable is too loose. Loosen cable clip and pull cable up to remove slack and retighten clip.
- Recheck in “ON” position and adjust if necessary.

NOTE: If “ON” position check required adjustment, recheck “OFF” position adjustment ensure tines do not rotate when control is “OFF” (up).

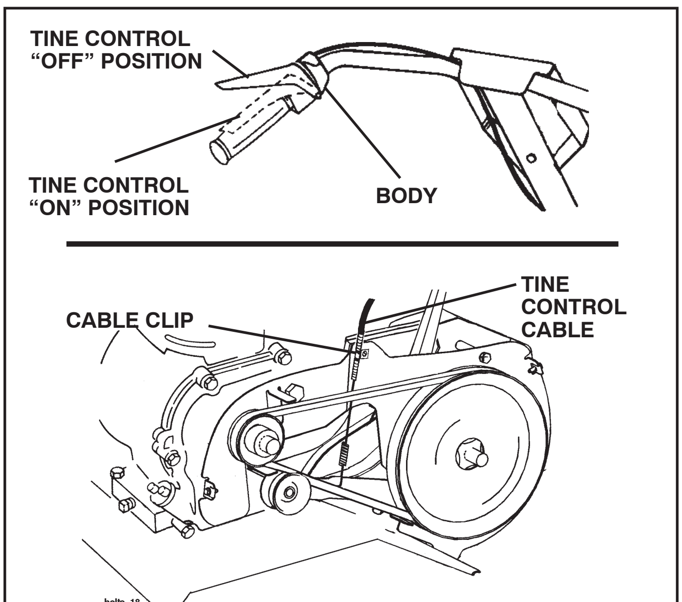


Fig. 19

TO REMOVE BELT GUARD (See Fig. 20)

- Remove screws from side of belt guard.
- Pull belt guard out and away from unit.
- Replace belt guard by reversing above procedure. Ensure slot in bottom of belt guard is under head of tine shield bolt and all nuts are tightened securely.

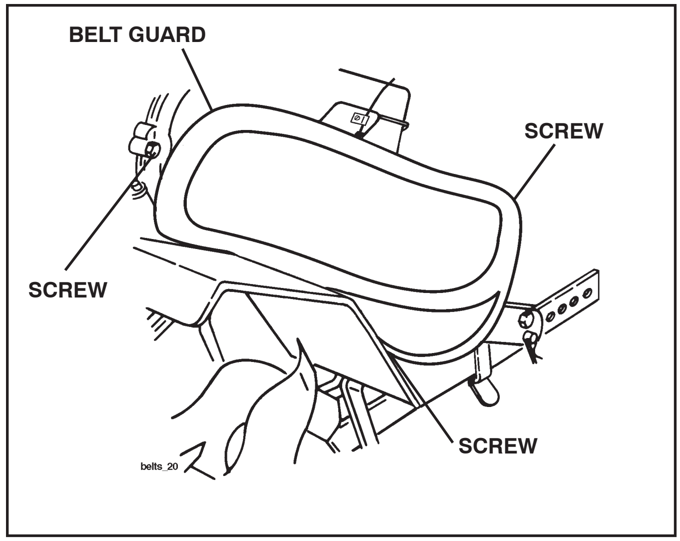


Fig. 20

TO REPLACE V-BELT (See Fig. 21)

Replace V-belt if it has stretched considerably or if it has cracks or frayed edges.

Belt guard must be removed to service belt. See “TO REMOVE BELT GUARD” in this section of manual.

BELT REMOVAL

- Remove V-belt from transmission pulley first and then from engine pulley.

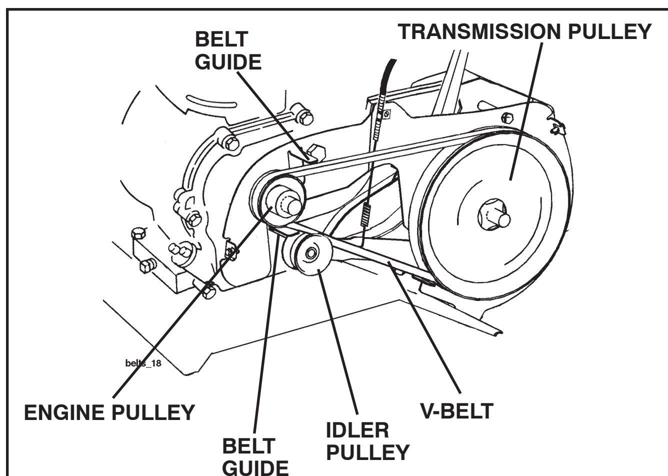


Fig. 21

BELT REPLACEMENT

- Install new V-belt to engine pulley first then to transmission pulley. Ensure belt is positioned on inside groove of both pulleys, inside all belt guides and rests on idler pulley.

CHECK TINE OPERATION

- See "TINE OPERATION CHECK" in this section of manual.

REPLACE BELT GUARD

ENGINE

TO ADJUST CARBURETOR

The carburetor has been preset at the factory and adjustment should not be necessary. However, engine performance can be affected by differences in fuel, temperature, altitude or load. If the carburetor does need adjustment, contact your nearest authorized service center/department

IMPORTANT: NEVER TAMPER WITH THE ENGINE GOVERNOR, WHICH IS FACTORY SET FOR PROPER ENGINE SPEED. OVERSPEEDING THE ENGINE ABOVE THE FACTORY HIGH SPEED SETTING CAN BE DANGEROUS. IF YOU THINK THE ENGINE-GOVERNED HIGH SPEED NEEDS ADJUSTING, CONTACT YOUR NEAREST AUTHORIZED SERVICE CENTER/ DEPARTMENT, WHICH HAS THE PROPER EQUIPMENT AND EXPERIENCE TO MAKE ANY NECESSARY ADJUSTMENTS.

STORAGE

Immediately prepare your tiller for storage at the end of the season or if the unit will not be used for 30 days or more.

> **WARNING: Never store the tiller with gasoline in the tank inside a building where fumes may reach an open flame or spark. Allow the engine to cool before storing in any enclosure.**

TILLER

- Clean entire tiller (See "CLEANING" in the Maintenance section of this manual).
- Inspect and replace belts, if necessary (See belt replacement instructions in the Service and Adjustments section of this manual).
- Lubricate as shown in the Maintenance section of this manual.
- Ensure that all nuts, bolts and screws are securely fastened. Inspect moving parts for damage, breakage and wear. Replace if necessary.
- Touch up all rusted or chipped paint surfaces; sand lightly before painting.

ENGINE

FUEL SYSTEM

IMPORTANT: IT IS IMPORTANT TO PREVENT GUM DEPOSITS FROM FORMING IN ESSENTIAL FUEL SYSTEM PARTS SUCH AS THE CARBURETOR, FUEL FILTER, FUEL HOSE, OR TANK DURING STORAGE. ALSO, EXPERIENCE INDICATES THAT ALCOHOL BLENDED FUELS (CALLED GASOHOL OR USING ETHANOL OR METHANOL) CAN ATTRACT MOISTURE WHICH LEADS TO SEPARATION AND FORMATION OF ACIDS DURING STORAGE. ACIDIC GAS CAN DAMAGE THE FUEL SYSTEM OF AN ENGINE WHILE IN STORAGE.

- Empty the fuel tank by starting the engine and let it run until the fuel lines and carburetor are empty.
- Never use engine or carburetor cleaner products in the fuel tank or permanent.
- Use fresh fuel next season.

NOTE: Fuel stablizer is an acceptable alternative in minimizing the formation of fuel gum deposits during storage. Add stabilizer to gasoline in fuel tank or storage container. Always follow the mix ratio found on stablizer container. Run engine at least 10 minutes after adding stablizer to allow the stabilizer to reach the carburetor. Do not empty the gas tank and carburetor if using fuel stabilizer.

ENGINE OIL

Drain oil (with engine warm) and replace with clean oil. (See "ENGINE" in the Maintenance section of this manual.)

CYLINDER(S)

- Remove spark plug.
- Pour 1 ounce (29 ml) of oil through spark plug hole into cylinder.
- Pull starter handle slowly several times to distribute oil.
- Replace with new spark plug.

OTHER

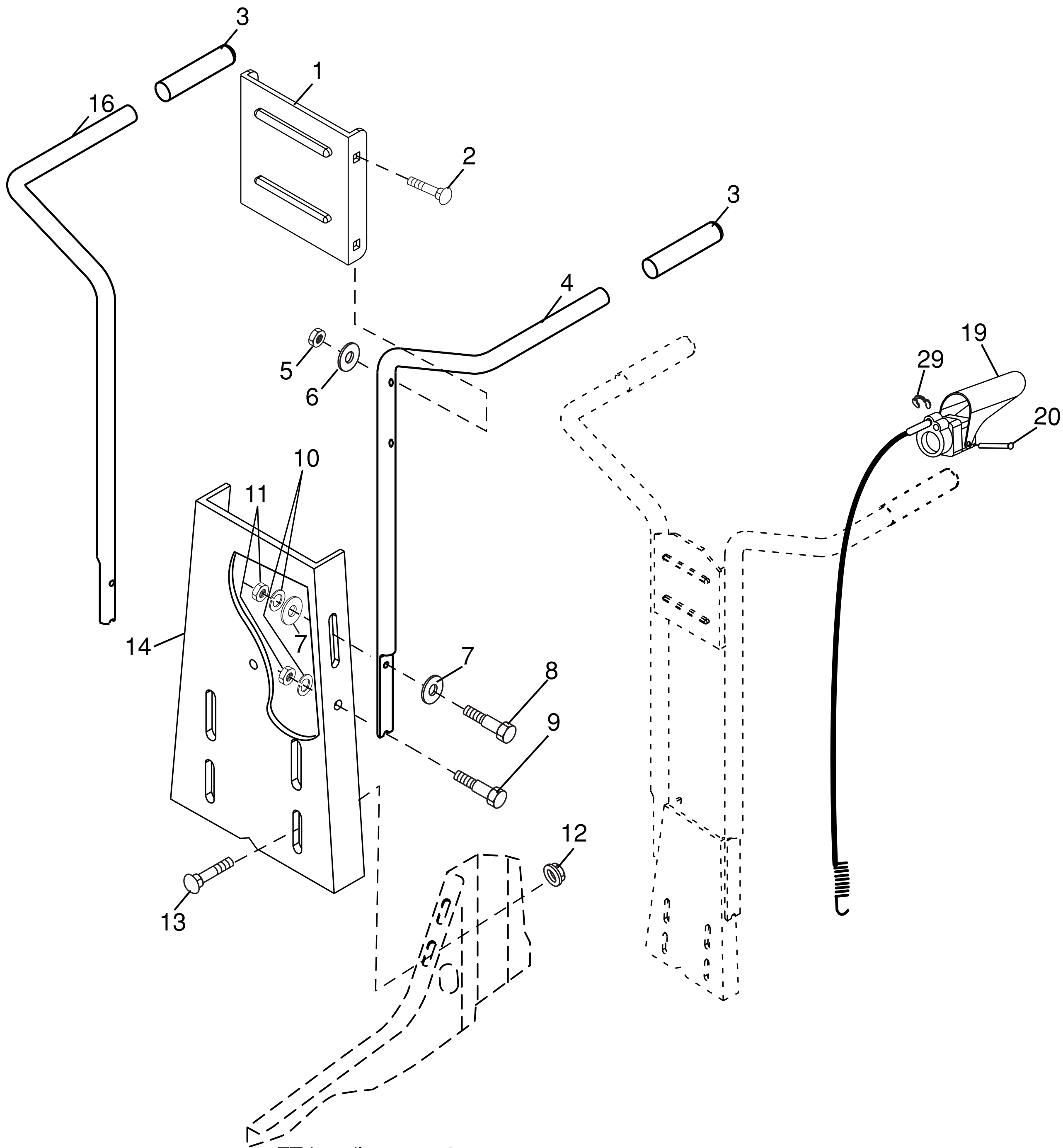
- Do not store gasoline from one season to another.
- Replace your gasoline can if your can starts to rust. Rust and/or dirt in your gasoline will cause problems.
- If possible, store your unit indoors and cover it to give protection from dust and dirt.
- Cover your unit with a suitable protective cover that does not retain moisture. Do not use plastic. Plastic cannot breathe which allows condensation to form and will cause your unit to rust.

IMPORTANT: NEVER COVER TILLER WHILE ENGINE AND EXHAUST AREAS ARE STILL WARM.

TROUBLESHOOTING POINTS

PROBLEM	CAUSE	CORRECTION
Will not start	1. Out of fuel. 2. Engine not "CHOKED" properly. 3. Engine flooded. 4. Dirty air cleaner. 5. Water in fuel. 6. Clogged fuel tank. 7. Loose spark plug wire. 8. Bad spark plug or improper gap. 9. Carburetor out of adjustment.	1. Fill fuel tank. 2. See "TO START ENGINE" in the Operation section. 3. Wait several minutes before attempting to start. 4. Clean or replace air cleaner cartridge. 5. Empty fuel tank and carburetor, and refill tank with fresh gasoline. 6. Remove fuel tank and clean. 7. Ensure spark plug wire is seated properly on plug. 8. Replace spark plug or adjust gap. 9. Make necessary adjustments.
Hard to start	1. Throttle control not set properly. 2. Dirty air cleaner. 3. Bad spark plug or improper gap. 4. Stale or dirty fuel. 5. Loose spark plug wire. 6. Carburetor out of adjustment.	1. Place throttle control in "FAST" position. 2. Clean or replace air cleaner cartridge. 3. Replace spark plug or adjust gap. 4. Empty fuel tank and refill with fresh gasoline. 5. Ensure spark plug wire is seated properly on plug. 6. Make necessary adjustments.
Loss of power	1. Engine is overloaded. 2. Dirty air cleaner. 3. Low oil level/dirty oil. 4. Faulty spark plug. 5. Oil in fuel. 6. Stale or dirty fuel. 7. Water in fuel. 8. Clogged fuel tank. 9. Spark plug wire loose. 10. Dirty engine air screen. 11. Dirty/clogged muffler. 12. Carburetor out of adjustment. 13. Poor compression.	1. Set depth stake and wheels for shallower tilling. 2. Clean or replace air cleaner cartridge. 3. Check oil level/change oil. 4. Clean and regap or change spark plug. 5. Empty and clean fuel tank and refill, and clean carburetor. 6. Empty fuel tank and refill with fresh gasoline. 7. Empty fuel tank and carburetor, and refill tank with fresh gasoline. 8. Remove fuel tank and clean. 9. Connect and tighten spark plug wire. 10. Clean engine air screen. 11. Clean/replace muffler. 12. Make necessary adjustments. 13. Contact an authorized service center/department.
Engine overheats	1. Low oil level/dirty oil. 2. Dirty engine air screen. 3. Dirty engine. 4. Partially plugged muffler. 5. Improper carburetor adjustment.	1. Check oil level/change oil. 2. Clean engine air screen. 3. Clean cylinder fins, air screen, muffler area. 4. Remove and clean muffler. 5. Adjust carburetor to richer position.
Excessive bounce/ difficult handling	1. Ground too dry and hard. 2. Wheels and depth stake incorrectly adjusted.	1. Moisten ground or wait for more favorable soil conditions. 2. Adjust wheels and depth stake.
Soil balls up or clumps	1. Ground too wet.	1. Wait for more favorable soil conditions.
Engine runs but tiller won't move	1. Tine control is not engaged. 2. V-belt not correctly adjusted. 3. V-belt is off pulley(s).	1. Engage tine control. 2. Inspect/adjust V-belt. 3. Inspect V-belt.
Engine runs but labors when tilling	1. Tilling too deep. 2. Throttle control not properly adjusted. 3. Carburetor out of adjustment.	1. Set depth stake for shallower tilling. 2. Check throttle control setting. 3. Make necessary adjustments.

HANDLE ASSEMBLY



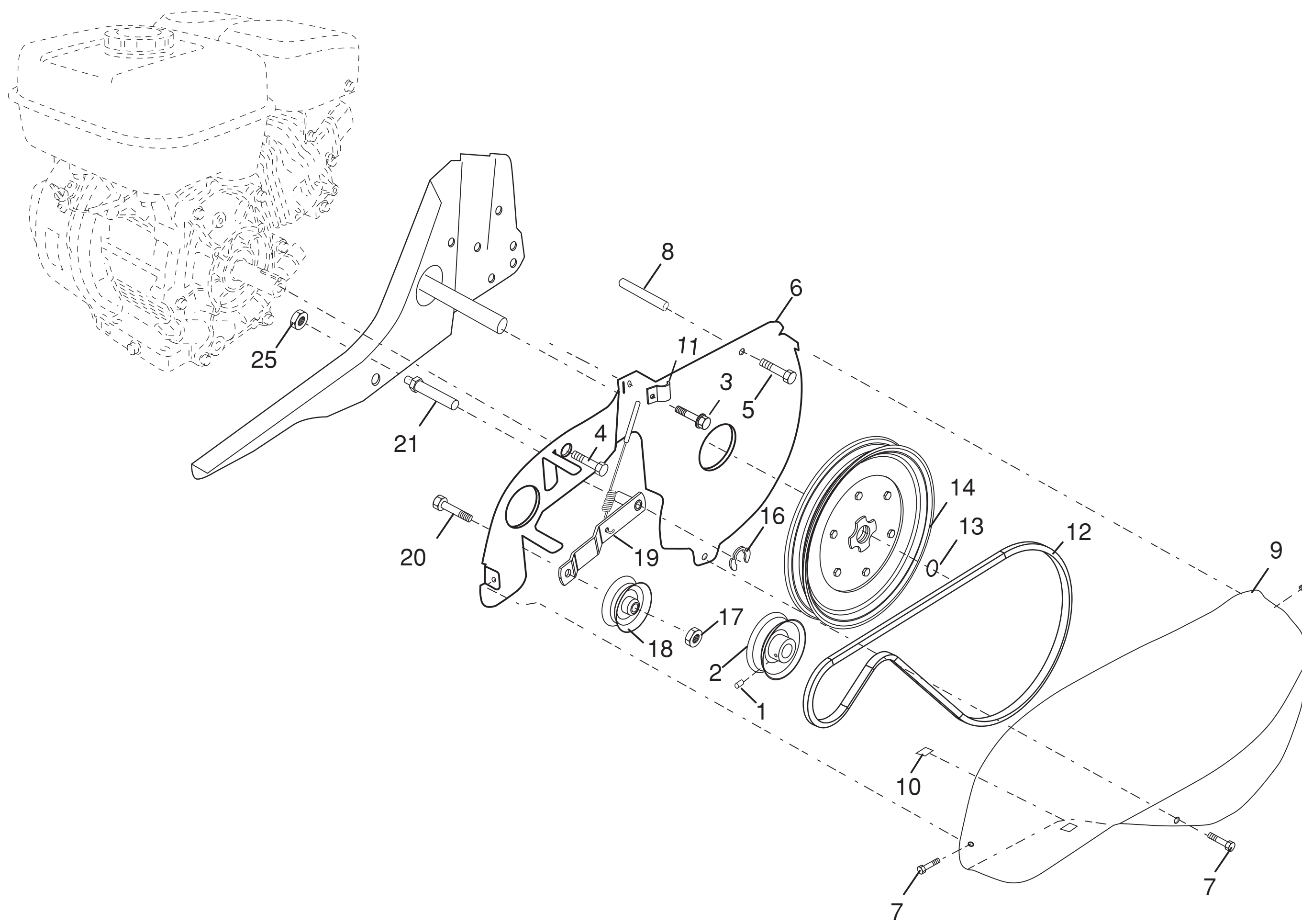
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FRONT TINE TILLER – MODEL NUMBER 90203200 (MFG. ID. NO. 96086000100)
HANDLE ASSEMBLY

ITEM NO.	MFG. NO.	ARIENS PART NO.	DESCRIPTION
1	137176	21546089	Bracket, Handle
2	72140512	21546771	Bolt, Carriage 5/16-18 x 1-1/2
3	165787	21546171	Grip, Handle
4	166376	21546175	Handle, L.H.
5	73680500	21546784	Nut, Hex, Crownlock 5/16-18
6	19111116	21546279	Washer 11/32 x 11/16 x 16 Ga.
7	19121414	21546281	Washer 3/8 x 7/8 x 14 Ga.
8	74760520	21546806	Bolt, Hex Head 5/16-18 x 1-1/4
9	74760516	21546805	Bolt, Hex Head 5/16-18 x 1
10	10040500	21546002	Washer, Lock 5/16
11	73220500	21546775	Nut, Hex 5/16-18
12	98000129	21546840	Nut, Hex, Flanged 5/16-18
13	180847	21546218	Bolt, Carriage, Gr. 5 5/16-18 x 3/4
14	9209R	21546838	Panel, Handle
16	166377	21546176	Handle, R.H.
19	188562	21546266	Tine Control Lever Assembly (Includes Cable)
20	188555	21546265	Pin, Pivot
29	12000059	21546059	Retaining Ring

NOTE: All component dimensions are given in U.S. inches.
1 inch = 25.4 mm

FRONT TINE TILLER – MODEL NUMBER 90203200 (MFG. ID. NO. 96086000100)
BELT GUARD AND PULLEY ASSEMBLY



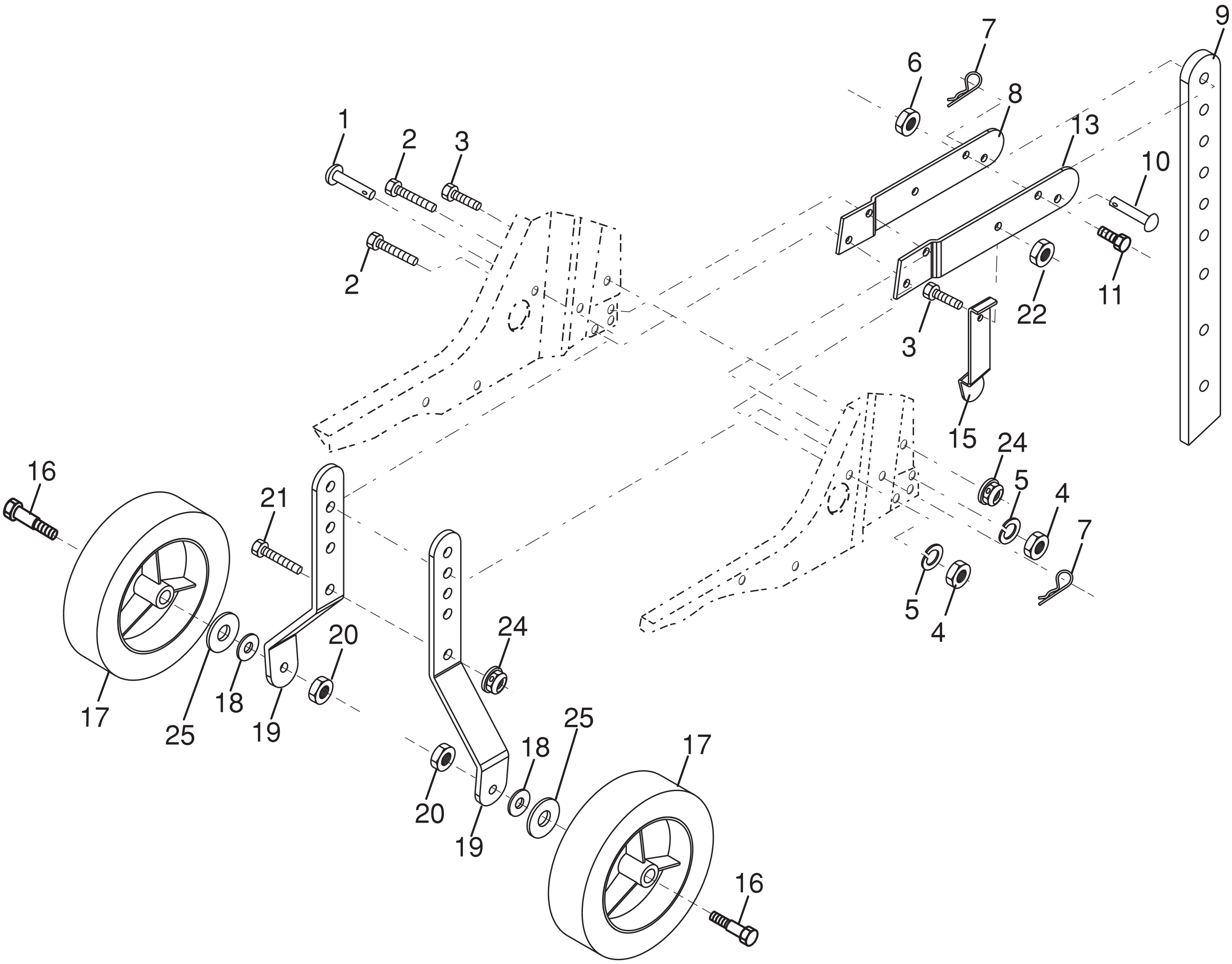
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BELT GUARD AND PULLEY ASSEMBLY

ITEM NO.	MFG. NO.	ARIENS PART NO.	DESCRIPTION
1	23230506	21546545	Screw Set 5/16-18 x 3/8 Patch
2	130812	21546079	Sheave, Engine
3	86777	21546830	Screw, Tap Hex Head
4	74770508	21546813	Bolt, Hex Head 5/16-24 unf x 1/2
5	17490440	21546198	Bolt, Thd Roller 1/4-20 x 2-1/2
6	422920	21546700	Shield, Inner Belt Guard
7	170488	21546185	Screw Hex Wsh Hd #8-18 x 1/2
8	139155	21546096	Spacer Split
9	165768X422	21546170	Guard, Belt
10	109227X	21546040	Pad, Idler
11	9484R	21546839	Clip, Cable
12	9180R	21546835	V-Belt
13	12000028	21546052	Ring, Retainer
14	151223	21546123	Sheave, Transmisison
16	12000036	21546056	Ring, Klip
17	73350600	21546778	Nut, Hex, Jam 3/8-16
18	161806	21546159	Pulley, Idler
19	175377	21546202	Arm, Idler
20	74760620	21546812	Bolt, Hex Head 3/8-16 x 1-1/4
21	106968X	21546039	Shaft, Idler Arm
25	73350500	21546777	Nut, Hex, Jam 5/16-18

NOTE: All component dimensions given in U.S.inches.
1 inch = 25.4 mm

FRONT TINE TILLER – MODEL NUMBER 90203200 (MFG. ID. NO. 96086000100)
WHEEL AND DEPTH STAKE ASSEMBLY



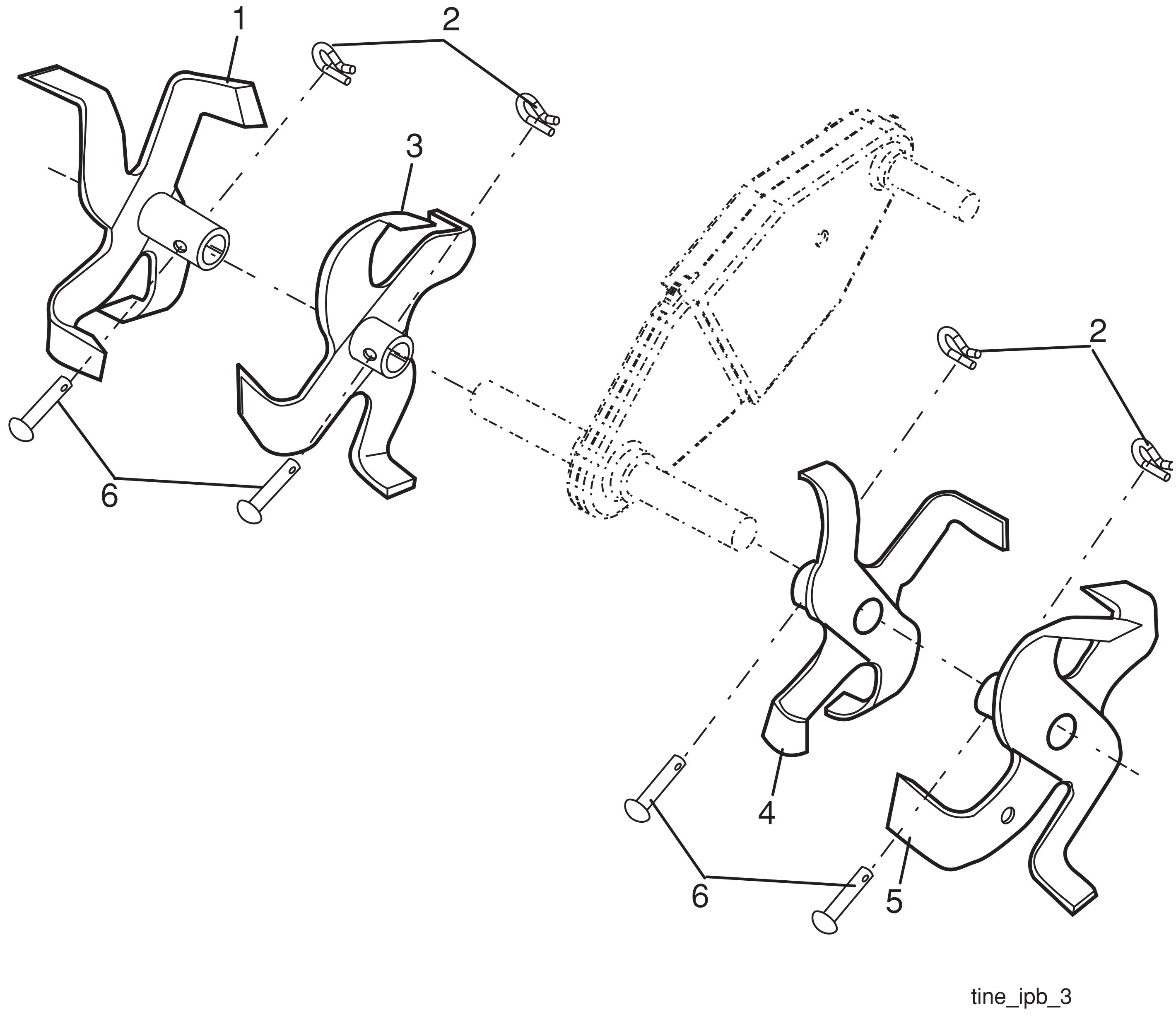
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WHEEL AND DEPTH STAKE ASSEMBLY

ITEM NO.	MFG. NO.	ARIENS PART NO.	DESCRIPTION
1	9194R	21546837	Pin, Clevis
2	74760520	21546806	Bolt, Hex Head 5/16-18 x 1-1/4
3	74760512	21546804	Bolt, Hex Head 5/16-18 x 3/4
4	73220500	21546775	Nut, Hex 5/16-18
5	10040500	21546002	Washer, Lock 5/16
6	73800600	21546787	Locknut, Washer Insert 3/8-16
7	4921H	21546742	Clip, Hairpin
8	1952J	21546361	Support, Depth Stake, R.H.
9	122233X	21546068	Stake, Depth
10	326J	21546549	Pin, Clevis
11	74780628	21546816	Bolt, Hex Head 3/8-16 x 1-3/4
13	1951J	21546349	Support, Depth Stake, L.H.
15	5388J	21546745	Spring, Stake
16	121117X	21546063	Bolt, Shoulder
17	400246X428	21546555	Wheel
18	19131311	21546282	Washer 13/32 x 13/16 x 11 Ga.
19	9190R	21546836	Bracket, Wheel
20	73680600	21546785	Nut, Hex, Crownlock 3/8-16
21	74760516	21546805	Bolt, Hex Head 5/16-18 x 1
22	73800500	21546786	Locknut, Washer Insert 5/16-18
24	73970500	21546796	Nut, Hex, Flangelock
25	19171416	21546289	Washer, 17/32 x 7/8 x 16 Ga.

NOTE: All component dimensions are given in U.S. inches.
1 inch = 25.4 mm

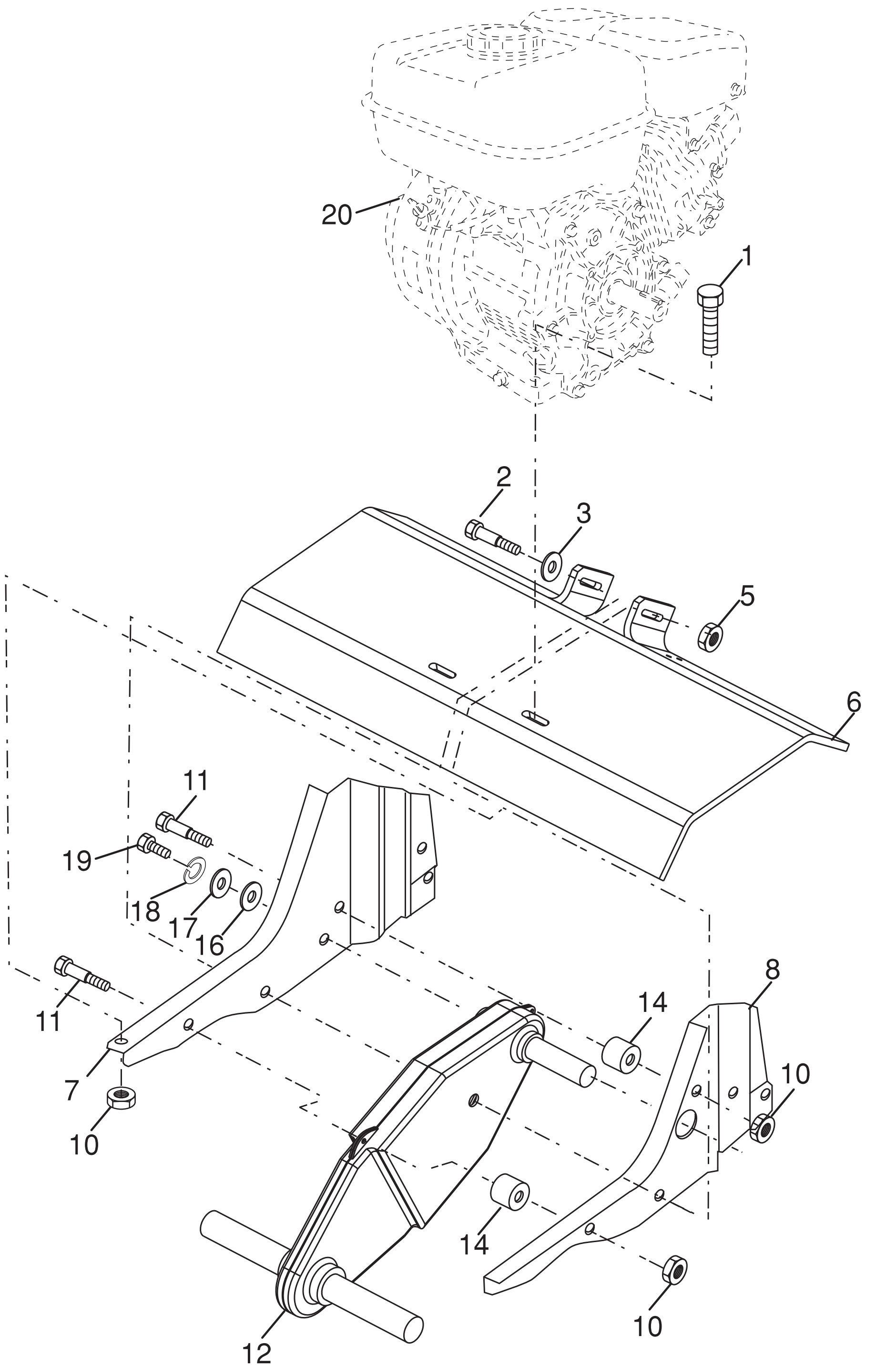
FRONT TINE TILLER – MODEL NUMBER 90203200 (MFG. ID. NO. 96086000100)
TINE ASSEMBLY



ITEM NO.	MFG. NO.	ARIENS PART NO.	DESCRIPTION
1	156929	21546140	Tine, Outer, R.H.
2	3146R	21546548	Retainer, Spring
3	156924	21546138	Tine, Inner, R.H.
4	156923	21546137	Tine, Inner, L.H.
5	156925	21546139	Tine, Outer, L.H.
6	4929H	21546743	Pin, Clevis

NOTE: All component dimensions are given in U.S. inches.
1 inch = 25.4 mm

FRONT TINE TILLER – MODEL NUMBER 90203200 (MFG. ID. NO. 96086000100)
TRANSMISSION



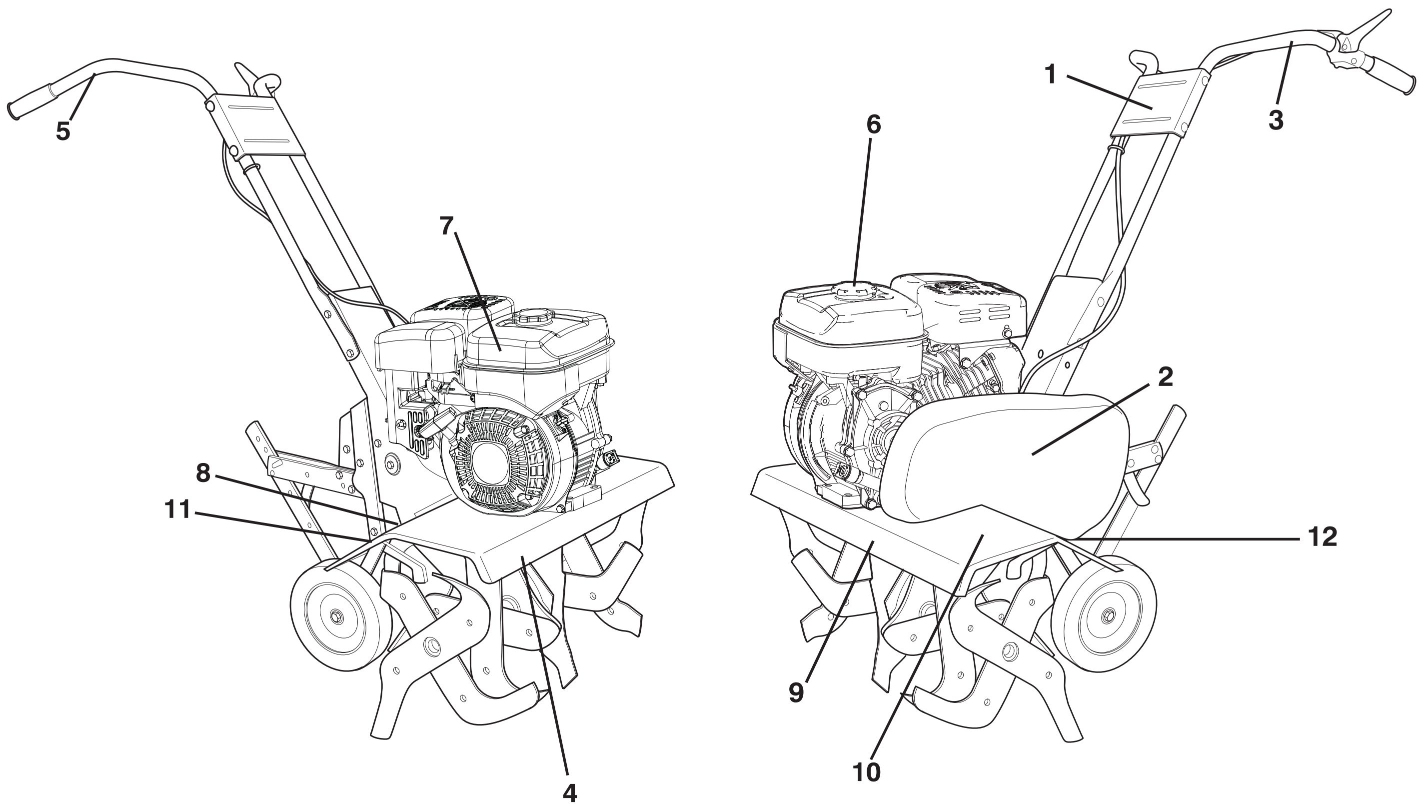
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TRANSMISSION

ITEM NO.	MFG. NO.	ARIENS PART NO.	DESCRIPTION
1	74760524	21546807	Bolt, Hex Head, Gr. 25/16-18 x 1-1/2
2	74780652	21546817	Bolt, Hex Head, 3/8-16 x 3-1/4
3	19131311	21546282	Washer 13/32 x 13/16 x 11 Ga.
5	73900600	21546790	Nut, Hex, Flangelock 3/8-16
6	9056R422	21546833	Shield, Tine
7	188195	21546256	Bracket, Engine, R.H.
8	165834	21546172	Bracket, Engine, L.H.
10	73970500	21546796	Nut, Hex, Flangelock
11	187912	21546255	Bolt, Shoulder
12	151222	21546122	Transmission
14	9173R	21546834	Spacer, Split
16	19091412	21546276	Washer, 9/32 x 7/8 x 12 Ga.
17	19092016	21546278	Washer, 9/32 x 1-1/4 x 16 Ga.
18	10040400	21546001	Washer, Lock 1/4
19	74610412	21546801	Bolt, Hex Head, Gr. 51/4-28 x 3/4
20	- - -	- - -	Engine, Subaru, Model Number EX170DT1030 (Order parts from engine manufacturer)

NOTE: All component dimensions are given in U.S. inches.
1 inch = 25.4 mm

DECALS



DECALS

ITEM NO.	MFG. NO.	ARIENS PART NO.	DESCRIPTION
1	423719	21546717	Decal, Console
2	424723	21546734	Decal, Belt Guard
3	110613X	21546047	Decal, Tine Control
4	423701	21546713	Decal, Subaru Tine Shield
5	110614X	21546048	Decal, Hand Placement
6	423830	21546720	Decal, Ethonal
7	424102	21546727	Decal, Spark Arrester
8	422972	21546701	Decal, Warning
9	423702	21546714	Decal, 24" Tine Shield
10	422816	21546695	Decal, Flag
11	120076X	21546060	Decal, Warning, Rotating Tines
12	425892	21546736	Decal, Read Owners Manual
- -	423442		Manual, Owners, English/French
- -	426045		Manual, Owners Spanish

NOTE: All component dimensions are given in U.S. inches.
1 inch = 25.4 mm

Two-Year Limited Tiller Warranty

This warranty statement applies only to Tillers.

Ariens Company (Ariens) warrants to the **original purchaser** that Ariens brand consumer tillers will be free from defects in material and workmanship for a period of two years after the date of purchase. An authorized Ariens dealer will repair any defect in material or workmanship, and repair or replace any defective part, subject to the conditions, limitations and exclusions set forth herein. Such repair or replacement will be free of charge (labor and parts) to the original purchaser except as noted below.

90-Day Limited Warranty on Service Parts and Accessories

Genuine Ariens brand service parts and accessories are warranted to be free from defects in material and workmanship for a period of 90 days after the date of purchase. An authorized Ariens dealer will repair or replace any such part or accessory free of charge, except for labor, during that period.

The duration of all warranties herein applies only if the product is put to personal use around a household or residence. If the product is put to any business use, agricultural, commercial, or industrial, then the duration of these warranties shall be 90 days after the date of purchase. If any product is rented or leased, then the duration of these warranties shall be 90 days after the date of purchase.

Exceptions, Limitations, Exclusions

Customer Responsibilities

Register the product immediately at the time of sale. If the dealer does not register the product, the customer must complete the product registration card in the literature package and return it to the Ariens Company, or register the unit online at www.ariens.com.

To obtain warranty service, the **original purchaser** must:

- Perform the maintenance and minor adjustments explained in the owner's manual.
- Promptly notify Ariens or an authorized Ariens service representative of the need for warranty service.
- Transport the product to and from the place of warranty service.
- Have the warranty service performed by an authorized Ariens service representative.

To find an Ariens authorized service representative, contact Ariens at:

655 W. Ryan Street
Brillion, WI 54110
(800) 317 - 5898
(920) 756 - 2141
www.ariens.com

Exceptions and Limitations

- Batteries are warranted only for a period of 12 months after date of purchase, on a prorated basis. For the first 90 days of the warranty period, a defective battery will be replaced free of charge. If the applicable warranty period is more than 90 days, Ariens will cover the prorated cost of any defective battery, for up to 12 months after the date of purchase.

Exclusions – Items Not Covered by This Warranty

- Engines and engine accessories are covered only by the engine manufacturer's warranty and are not covered by this warranty.
- Parts that are not genuine Ariens service parts are not covered by this warranty.
- The following maintenance, service and replacement items are not covered by this warranty unless they are noted in the Limitations section above: lubricants, spark plugs, oil, oil filters, air filters, fuel filters, brake linings, brake arms, shoes, runners, scraper blades, shear bolts, mower blades, mower vanes, tines, brushes, headlights, light bulbs, knives, cutters.
- Any misuse, alteration, improper assembly, improper adjustment, neglect, or accident which requires repair is not covered by this warranty.
- This warranty applies only to products purchased in the United States (including Puerto Rico) and Canada. In all other countries, contact place of purchase for warranty information.

Disclaimer

Ariens may from time to time change the design of its products. Nothing contained in this warranty shall be construed as obligating Ariens to incorporate such design changes into previously manufactured products, nor shall such changes be construed as an admission that previous designs were defective.

LIMITATION OF REMEDY AND DAMAGES

Ariens Company's liability under this warranty, and under any implied warranty that may exist, is limited to repair of any defect in workmanship, and repair or replacement of any defective part. Ariens shall not be liable for incidental, special, or consequential damages (including lost profits). Some states do not allow the exclusion of incidental or consequential damages, so the above limitation or exclusion may not apply to you.

DISCLAIMER OF FURTHER WARRANTY

Ariens Company makes no warranty, express or implied, other than what is expressly made in this warranty. If the law of your state provides that an implied warranty of merchantability, or an implied warranty of fitness for particular purpose, or any other implied warranty, applies to Ariens Company, then any such implied warranty is limited to the duration of this warranty. Some states do not allow limitations on how long an implied warranty lasts, so the above limitation may not apply to you.

This warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

Ariens Company
655 West Ryan Street
Brillion, WI 54110-1072
800-317-5898
www.ariens.com

PARTS AND SERVICE

This product has been expertly engineered and carefully manufactured to rigid quality standards. As with all mechanical products, some adjustments or part replacement may be necessary during the life of your unit.

For parts and service, contact your local Ariens dealer. To find a dealer in your area, call 1-800-317-5898, or use the Dealer Locator on our web site, www.ariens.com.

- For replacement parts, have available the following information:
  a. Model Number/Manufacturer's I.D. Number.
  b. Description of part.

For Technical Assistance: call 1-800-317-5898.

For a Parts Manual, go to our website: www.ariens.com/customerservice/default.aspx

WARNING

The engine exhaust from this product contains chemicals known to the State of California to cause cancer, birth defects or other reproductive harm.